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ECL 279

# A GUARD? WHO NEEDS IT?

"I have a client who had his left hand mangled while using a cut-off machine. Can you visit the plant and take a look at the machine for me?" This was a phone call from Max Birdsong, an attorney for whom I had investigated a number of cases. [As told by Dr. C. Faber.]

1994 Written by C. O. Smith, Engineering Consultant, Terre Haute, Indiana

All names and places have been changed to protect the innocent (or guilty).

Joe Bowen was operating a cut-off machine at Specialty Tube Co. at about 1:00 am when he was injured. This machine is essentially a single-purpose machine used to cut tubing to length. The machine in operation is shown in Exhibits 1 and 2. The tube is supplied from the left, passes through the feeder rolls into the machine where a cut-off wheel cuts off the desired length which, in turn, leaves the machine on the right side. An operator feeds the raw stock into the machine with the left hand. The switches and controls are operated with the right hand.

My understanding was that Joe Bowen had his left hand, wrist, and arm caught in the feeder rolls with the result that he suffered severe lacerating and crushing injuries which were permanently crippling. The day he was injured was the first day of work he had ever lost due to accident or injury. He was able to return to work about ten months after being injured.

I discussed the situation with Bill Rhomberg, the plant manager at Specialty Tube. He told me that a bad tube, e.g., a split seam or other defect, can give trouble, especially if the operator is wearing a glove. He related that other operators had had similar problems prior to Joe Bowen's injury. The others resulted in bruised finger tips or minor injuries. A second man was almost seriously injured. Joe Bowen, however, was hurt much worse than any previous operator. Bill Rhomberg believed an injured operator (such as Joe Bowen) could have reached the switch with his right hand from his position. Bill Rhomberg and I agreed there was a clear tendency for the left hand to continue to move with the tube as the tube moves toward the feeder rolls. It also seemed to me that the operator is especially susceptible to getting the left hand caught in the feeder rolls as attention can be readily diverted to the right while using the controls. But as Bill Rhomberg said: "A worker can get his hand caught if he isn't careful."

Exhibit 1. Machine operator showing how cut-off machine operates. Long tube is fed by the left hand into feeder rolls through the machine which cuts off a section of desired length. The switch and all operational controls are operated by the right hand.

Exhibit 2. View of left side of machine head showing feeder rolls. The tube passes through these rolls and into the hole just visible in the head in back of the feeder rolls.

My reaction to what I saw was: "This is incredible!" This was the most flagrant example of failure to guard I had ever seen. A manufacturer of equipmemnt has the obligation to design out all hazards. If that is not possible, then there is the obligation to provide appropriate guarding. A warning is acceptable only if it is impossible to (1) design out and/or (2) provide effective guarding.

This machine is a single-purpose machine with a very obvious nip point. I would not suggest it is easy to design a machine to eliminate all hazards without possibly impairing the function. But it certainly is possible to provide a guard in machines such as this. In some situations, e.g., multiple use machines, it is essentially impossible to provide one guard which takes care of all possibilities. A power press, for example, may have several different sets of dies installed over a period of time. Each set may well need a guard specifically designed for that set. A "dedicated" (single-use) machine is much easier to guard.

From another viewpoint, the employer was in violation of the Federal Occupational Safety and Health Act (OSHA) which says that employers cannot legally operate equipment which exposes workers to unprotected hazards. This was a definite, obvious and unprotected hazard!

I discovered that personnel at Specialty Tube had designed, constructed, and installed a guard a few days after Joe Bowen was hurt. As shown in Exhibits 3 and 4, this is a simple three-sided "box" which is hinged at the top. A hole cut through one side allows tubing to pass into the feeder rolls but the guard prevents a hand going into the rolls with the tube. This is simple, effective and inexpensive. In my opinion, a guard (whether or not similar to the one developed by Speciality Tube) certainly could have been designed and supplied by the original manufacturer.

Bill Rhomberg commented that an operator occasionally puts the guard up so the work will go faster and thus collect more incentive pay. Obviously, that voids the protection of the guard. While the Specialty Tube personnel did make a good guard, they didn't make it quite good enough. The guard needs to be secured in some manner so that it can only be opened to provide human access to the feeder rolls during maintenance. One might consider an interlock or a lockout. Either would be a definite improvement but neither is a total guarantee against a worker taking steps to bypass them.

I have examined many machines over the course of the years I have been working as an expert witness in products liability litigation. This case was the fourth or fifth in which a worker had been injured because a machine was not properly designed or guarded by the manufacturer, yet the employer had devised a relatively simple guard to eliminate the hazard within a few days <u>after</u> a worker had been injured. There were three different situations in which I visited plants of one major manufacturer in which this had occurred. This manufacturer had a Safety Department and a Safety Program - I never was allowed to go into an operating area in one of its plants without a hard hat and safety glasses. I have never understood why a manufacturer (or employer) can see a problem and generate an effective fix <u>after</u> an injury but not before.

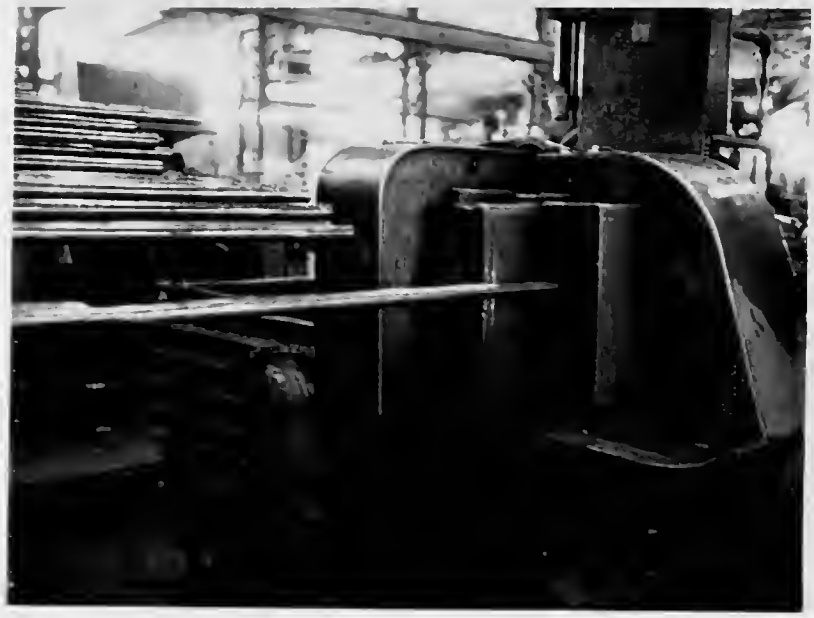

Exhibit 3. Cut-off machine in operation with employer designed, constructed, and installed guard in position to provide protection to the machine operator.

Exhibit 4. A closer view of the guard than shown in Exhibit 3. A portion of the lower feeder roll can be seen through the hole in the guard.

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An Instructor's Note is intended to offer suggestions as to possible use and to supply additional information which the author did not want to put in the text of the case.

Part A presents a straightforward problem. It offers an opportunity to focus on safety and how to provide it. If students are unaware of nip points, this can be discussed, not only for this specific case but in much broader context. The most likely assignment to give students is to develop a redesign of the cutoff machine or to design a guard which will provide the necessary protection for the operator. This probably will be a conceptual solution with sketches.

Part B shows one possible solution - simple, inexpensive, and partially effective. It would be effective if a means of making it impossible for an operator to void the guard had also been provided. As installed, all the operator has to do is lift the guard and rotate it about the hinge. When fully lifted, the guard will stay up in that position. Students may propose other ways of providing guarding - quite possibly in ways that are superior to the guard shown in Exhibits 3 and 4. All efforts, especially creative ones (which are not Rube Goldbergs) should be encouraged.

The case allows consideration of OSHA and other appropriate standards such as those of the American National Standards Institute (ANSI). The Federal OSHA was passed in 1970. As the act came into effect, a large number of existing safety standards were adopted as the basis of various aspects of OSHA. Today many of these standards are obsolete but, unfortunately, are still being used as the basis for OSHA regulations. For example, OSHA standards for mechanical power presses are based on the 1971 edition of ANSI B11.1. Since that time, the B11 Committee of ANSI has published at least 18 standards relating to the larger field of machine tools. One should not rely on OSHA regulations alone but determine the availability and applicability of the latest published standards. OSHA regulations must be used with caution. Even though many are obsolete, they still have the force of law. OSHA regulations are published in Title 29 of the Code of Federal Regulations (CFR). Section 1910 applies to general industry. A comment was made in Part B about lockouts. CFR 1910.147(c)(2)(iii) is specific relative to lockouts.

The basic legal requirements for guarding are set forth in CFR 1910.212, General requirements for all machines, which says: "(a) Machine guarding: (1) Types of guarding. One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are barrier guards, two-hand tripping devices, electronic safety devices, etc. (2) General requirements for machine guards. Guards shall be affixed to the machine where possible and secured elsewhare if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself." One should note the key word all in the heading. Further, the use of shall

makes the requirement mandatory.

There are more than 35,000 standards documents which have been generated by nearly 350 standards-writing organizations in the US. Two of the better known, which apply to machines and related equipment, are ANSI and Underwriters Laboratories (UL). The National Safety Council (Itasca, IL 60143) has three publications which may be of interest.

Accident Prevention Manual for Business and Industry,

Volume 1: Chapters on government regulations and standards, ergonomics, personal protective equipment, industrial sanitation and more. Completely new chapters on environmental management and employee assistance programs.

Volume 2: Focuses on one of the most vital safety and health issues - engineering safety into the design, construction and maintenance of industrial facilities. Topics include equipment safeguarding, materials handling and storage, hoists and cranes, and powered industrial trucks. Completely new chapter on automated processes and a new safety and health glossary.

Volume 3: Study guide for Volumes 1 and 2.

Safeguarding Concepts Illustrated, 6th Edition

This comprehensive handbook discusses conventional and high-tech safeguarding techniques, with over 300 photographs and line illustrations. Approximately 100 pages.

Power Press Safety Manual,4th Edition

Safeguard power press operations with the information contained in this fully illustrated manual. Includes basic press construction, employee training, noise abatement, ergonomics, point-of-operation safeguards and power press operations. 64 pages.

One might also want to explore the question of an employer with a not before but after accident safety fix. Is it that the employer assumes the equipment manufacturer has provided sufficient protection? It doesn't seem to be that the employer does not care since there is an active safety program in the plant. Is it that the employer does not make the effort to thoroughly examine the purchased equipment? Does it take an injury (sometimes fatal, sometimes permanently disabling) to get the employer's attention? How do students see the ethics, morality, or obligation of the employer in this situation (especially in light of OSHA regulations)? This might make a most interesting and illuminating discussion.